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## 2. Accelerating evolutionary algorithms with Gaussian process fitness function models

Buche, D.; Schraudolph, N.N.; Koumoutsakos, P.;  
Systems, Man and Cybernetics, Part C, IEEE Transactions on  
Volume 35, Issue 2, May 2005 Page(s):183 - 194  
Digital Object Identifier 10.1109/TSMCC.2004.841917

[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(584 KB) IEEE JNL

## 3. Using NU-SSGA to reduce the searching time in inverse problem of a burled metallic object

Wei Chien; Chien-Ching Chiu;  
Antennas and Propagation, IEEE Transactions on  
Volume 53, Issue 10, Oct. 2005 Page(s):3128 - 3134  
Digital Object Identifier 10.1109/TAP.2005.856362

[AbstractPlus](#) | Full Text: [PDF](#)(504 KB) IEEE JNL

## 4. Reliability optimization of series-parallel systems using a genetic algorithm

Coit, D.W.; Smith, A.E.;  
Reliability, IEEE Transactions on  
Volume 45, Issue 2, Jun 1996 Page(s):254 - 260, 266  
Digital Object Identifier 10.1109/24.510811

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## 5. Alternating cluster estimation: a new tool for clustering and function approximation

Runkler, T.A.; Bezdek, J.C.;  
Fuzzy Systems, IEEE Transactions on  
Volume 7, Issue 4, Aug. 1999 Page(s):377 - 393  
Digital Object Identifier 10.1109/91.784198

[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(460 KB) IEEE JNL

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Volume 36, Issue 1, Jan.-Feb. 2000 Page(s):1 - 46

Digital Object Identifier 10.1109/TIA.2000.821824

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7. **Generating high-speed dynamic running gaits in a quadruped robot using an evolutionary s-**  
Krasny, D.P.; Orin, D.E.;

Systems, Man and Cybernetics, Part B, IEEE Transactions on

Volume 34, Issue 4, Aug. 2004 Page(s):1685 - 1696

Digital Object Identifier 10.1109/TSMCB.2004.827611

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8. **Learning systems in intelligent control: an appraisal of fuzzy, neural and genetic algorithm c**  
Linkens, D.A.; Nyongesa, H.O.;

Control Theory and Applications, IEE Proceedings-

Volume 143, Issue 4, July 1996 Page(s):367 - 386

[AbstractPlus](#) | Full Text: [PDF](#)(2336 KB) IEEE JNL



9. **Target shape design optimization with evolutionary computation**

Wei-Wen Chang; Chan-Jin Chung; Sendhoff, B.;

Evolutionary Computation, 2003. CEC '03. The 2003 Congress on

Volume 3, 8-12 Dec. 2003 Page(s):1864 - 1870 Vol.3

Digital Object Identifier 10.1109/CEC.2003.1299899

[AbstractPlus](#) | Full Text: [PDF](#)(1551 KB) IEEE CNF



10. **The 2003 Congress on Evolutionary Computation - CEC 2003**

Evolutionary Computation, 2003. CEC '03. The 2003 Congress on

Volume 3, 8-12 Dec. 2003 Page(s):0\_1 - xxviii

Digital Object Identifier 10.1109/CEC.2003.1299849

[AbstractPlus](#) | Full Text: [PDF](#)(1980 KB) IEEE CNF



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[AbstractPlus](#) | Full Text: [PDF](#)(1975 KB) IEEE CNF



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Volume 4, 8-12 Dec. 2003 Page(s):vii - xxviii

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13. **2003 Congress on Evolutionary Computation (IEEE Cat. No.03TH8674)**

Evolutionary Computation, 2003. CEC '03. The 2003 Congress on

Volume 1, 8-12 Dec. 2003

Digital Object Identifier 10.1109/CEC.2003.1299547

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### 1 [Real world applications: Nonlinear feature extraction using a neuro genetic hybrid](#)



Yung-Keun Kwon, Byung-Ro Moon

 June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Publisher: ACM Press

 Full text available: pdf(361.05 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Feature extraction is a process that extracts salient features from observed variables. It is considered a promising alternative to overcome the problems of weight and structure optimization in artificial neural networks. There were many nonlinear feature extraction methods using neural networks but they still have the same difficulties arisen from the fixed network topology. In this paper, we propose a novel combination of genetic algorithm and feedforward neural networks for nonlinear feature ...

**Keywords:** feature extraction, function approximation, neuro-genetic hybrid

### 2 [Evolutionary strategies and evolutionary programming: Morphing methods in evolutionary design optimization](#)



Michael Nashvili, Markus Olhofer, Bernhard Sendhoff

 June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Publisher: ACM Press

 Full text available: pdf(446.38 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Design optimization is a well established application field of evolutionary computation. However, standard recombination operators acting on the genotypic representation of the design or shape are often too disruptive to be useful during optimization. In this work, we will analyze whether morphing methods between two shapes can be used as recombination operators acting on the phenotype space, thus directly on the shape or design. We introduce three different morphing methods and employ them as r ...

**Keywords:** design optimization, evolution strategies, morphing methods, phenotypic recombination

### 3 [Real world applications: Three dimensional evolutionary aerodynamic design optimization with CMA-ES](#)





Martina Hasenjäger, Bernhard Sendhoff, Toyotaka Sonoda, Toshiyuki Arima  
June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

**Publisher:** ACM Press

Full text available: [pdf\(2.37 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper, we present the application of evolutionary optimization methods to a demanding, industrially relevant engineering domain, the three-dimensional optimization of gas turbine stator blades. This optimization problem is high-dimensional search and computationally very expensive. We show that, despite of its difficulty, the problem is feasible. Our approach not only successfully optimizes the aerodynamic design but also yields interesting results from an engineering point of view.

**Keywords:** covariance matrix adaptation, design optimization, evolutionary strategies, real world application

#### 4 Simulation optimization: methods and applications



Yolanda Carson, Anu Maria  
December 1997 **Proceedings of the 29th conference on Winter simulation**

**Publisher:** ACM Press

Full text available: [pdf\(1.04 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

#### 5 Local control of bias and tension in beta-splines



Brian A. Barsky, John C. Beatty  
July 1983 **ACM SIGGRAPH Computer Graphics , Proceedings of the 10th annual conference on Computer graphics and interactive techniques SIGGRAPH '83**, Volume 17 Issue 3

**Publisher:** ACM Press

Full text available: [pdf\(1.37 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The Beta-spline introduced recently by Barsky is a generalization of the uniform cubic B-spline: parametric discontinuities are introduced in such a way as to preserve continuity of the unit tangent and curvature vectors at joints (geometric continuity) while providing bias and tension parameters, independent of the position of control vertices, by which the shape of a curve or surface can be manipulated. Using a restricted form of quintic Hermite interpolation, it is possible ...

**Keywords:** Beta-splines, computer-aided design, geometric continuity, polynomial splines, tension

#### 6 From splines to fractals



R. Szeliski, D. Terzopoulos  
July 1989 **ACM SIGGRAPH Computer Graphics , Proceedings of the 16th annual conference on Computer graphics and interactive techniques SIGGRAPH '89**, Volume 23 Issue 3

**Publisher:** ACM Press

Full text available: [pdf\(4.50 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Deterministic splines and stochastic fractals are complementary techniques for generating free-form shapes. Splines are easily constrained and well suited to modeling smooth, man-made objects. Fractals, while difficult to constrain, are suitable for generating various irregular shapes found in nature. This paper develops *constrained fractals*, a hybrid of

splines and fractals which intimately combines their complementary features. This novel shape synthesis technique stems from a formal co ...

## 7 A recursive evaluation algorithm for a class of Catmull-Rom splines



Phillip J. Barry, Ronald N. Goldman

June 1988 **ACM SIGGRAPH Computer Graphics , Proceedings of the 15th annual conference on Computer graphics and interactive techniques SIGGRAPH '88**, Volume 22 Issue 4

**Publisher:** ACM Press

Full text available: pdf(536.33 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

It is known that certain Catmull-Rom splines [7] interpolate their control vertices and share many properties such as affine invariance, global smoothness, and local control with B-spline curves; they are therefore of possible interest to computer aided design. It is shown here that another property a class of Catmull-Rom splines shares with B-spline curves is that both schemes possess a simple recursive evaluation algorithm. The Catmull-Rom evaluation algorithm is constructed by combining the d ...

**Keywords:** B-spline, Catmull-Rom spline, Lagrange polynomial, Neville's algorithm, de Boor algorithm, recursive evaluation algorithm

## 8 Discrete Beta-splines



Barry Joe

August 1987 **ACM SIGGRAPH Computer Graphics , Proceedings of the 14th annual conference on Computer graphics and interactive techniques SIGGRAPH '87**, Volume 21 Issue 4

**Publisher:** ACM Press

Full text available: pdf(652.66 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Goodman (1985) and Joe (1986) have given explicit formulas for (cubic) Beta-splines on uniform knot sequences with varying  $\epsilon_1$  and  $\epsilon_2$  values at the knots, and nonuniform knot sequences with varying  $\epsilon_2$  values at the knots, respectively. The advantage of the latter formula is that it can also be used for knot sequences with multiple knots. Discrete Beta-splines arise when a Beta-spline curve is subdivided, i.e. the knot sequence is refined so that the curve is expressed ...

## 9 Visualization of Volume Data with Quadratic Super Splines



Christian Rossli, Frank Zeilfelder, Gunther Nurnberger, Hans-Peter Seidel

October 2003 **Proceedings of the 14th IEEE Visualization 2003 (VIS'03) VIS '03**

**Publisher:** IEEE Computer Society

Full text available: pdf(849.48 KB) Additional Information: [full citation](#), [abstract](#)

We develop a new approach to reconstruct non-discrete models from gridded volume samples. As a model, we use quadratic trivariate super splines on a uniform tetrahedral partition  $\mathcal{T}$ . The approximating splines are determined in a natural and completely symmetric way by averaging local data samples, such that appropriate smoothness conditions are automatically satisfied. On each tetra-hedron of  $\mathcal{T}$ , the quasi-interpolating spline is a polynomial of total degree two which provides several advantages i ...

**Keywords:** volume rendering, reconstruction, quadratic super splines, tetrahedral partition, Bernstein-Bézier techniques, isosurface rendering, ray-casting

## 10 On computing the intersection of B-splines (extended abstract)



B. K. Natarajan

-  May 1990 **Proceedings of the sixth annual symposium on Computational geometry**  
**Publisher:** ACM Press

Full text available:  [pdf\(690.39 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We consider the problem of computing a piecewise linear approximation to the intersection of a pair of tensor product B-spline surfaces in 3-space. The problem is rather central in solid modeling. We present a fast and robust divide-and-conquer algorithm for the problem, that is a generalization of the bisection algorithm for computing the roots of non-linear equations. The algorithm is guaranteed to solve a "nearby" problem, and our analysis proves that its expected run-time is ...

## 11 Knot insertion for Beta-spline curves and surfaces



-  Barry Joe  
January 1990 **ACM Transactions on Graphics (TOG)**, Volume 9 Issue 1  
**Publisher:** ACM Press

Full text available:  [pdf\(1.62 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Discrete Beta-splines arise when a Beta-spline curve is subdivided; that is, extra knots are inserted so that the curve is expressed in terms of a larger number of control vertices and Beta-splines. Their properties and an algorithm for their computation are given in "Discrete Beta-Splines" by Joe (Computer Graphics, vol. 21, pp. 137-144). We prove a stronger version of one of these properties, from which a new algorithm for computing discrete B ...

## 12 Quartic Beta-splines



-  Barry Joe  
July 1990 **ACM Transactions on Graphics (TOG)**, Volume 9 Issue 3  
**Publisher:** ACM Press

Full text available:  [pdf\(2.23 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Quartic Beta-splines have third-degree arc-length or geometric continuity at simple knots and are determined by three  $\beta$  or shape parameters. We present a general explicit formula for quartic Beta-splines, and determine and illustrate the effects of varying the  $\beta$  parameters on the shape of a quartic Beta-spline curve. We show that quartic (and higher degree) rational Beta-splines with arc-length continuity satisfy the same continuity conditions as (nonrational) Beta-splines. We also ...

## 13 Two remarks on Tau-splines



-  Dieter Lasser  
April 1990 **ACM Transactions on Graphics (TOG)**, Volume 9 Issue 2  
**Publisher:** ACM Press

Full text available:  [pdf\(795.63 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#), [review](#)

We present a Bézier representation of  $\tau$ -splines, curvature and torsion-continuous quintics, which were introduced in CAGD by Hagen in 1985 [32]. Explicit formulas are given for the conversion from Bézier representation to  $\tau$ -spline representation, and vice versa. Thus, by embedding the Bézier representation in a  $\tau$ -spline representation of curvature and torsion-continuous quintic spline curves, given in [20], a  $\tau$ -spline-Bézier representation of  $\tau$  ...

## 14 A round trip to B-splines via de Casteljau



- Hartmut Prautzsch  
July 1989 **ACM Transactions on Graphics (TOG)**, Volume 8 Issue 3



**Publisher:** ACM Press

Full text available: pdf(610.84 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

B-splines are constructed from Bézier curves solely using de Casteljau's construction. Divided differences are not being used, nor is Mansfield's recurrence formula presupposed. Yet, it is shown how to differentiate, subdivide, and evaluate a B-spline. These results are derived from the corresponding techniques of Bézier curves.

## 15 Multiple-knot and rational cubic beta-splines



Barry Joe

April 1989 **ACM Transactions on Graphics (TOG)**, Volume 8 Issue 2

**Publisher:** ACM Press

Full text available: pdf(1.42 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Goodman (Properties of Beta-splines. J. Approx. Theory 44, 2 (June 1985), 132-153) gave an explicit formula for cubic Beta-splines on a uniform knot sequence with varying  $\beta_1$  and  $\beta_2$  values at the knots. We establish an alternative explicit formula for cubic Beta-splines on a nonuniform knot sequence with constant  $\beta_1 = 1$  and varying  $\beta_2$  values at the knots. This alternative formula can also be used if the knot sequence contains multiple knots, and is useful for ...

## 16 Spherical averages and applications to spherical splines and interpolation



Samuel R. Buss, Jay P. Fillmore

April 2001 **ACM Transactions on Graphics (TOG)**, Volume 20 Issue 2

**Publisher:** ACM Press

Full text available: pdf(214.52 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This article introduces a method for computing weighted averages on spheres based on least squares minimization that respects spherical distance. We prove existence and uniqueness properties of the weighted averages, and give fast iterative algorithms with linear and quadratic convergence rates. Our methods are appropriate to problems involving averages of spherical data in meteorological, geophysical, and astronomical applications. One simple application is a method for smooth averaging of quat ...

**Keywords:** Bézier curve, B-spline, barycentric coordinates, least squares minimization, quaternion interpolation, quaternions, spherical average, spherical interpolation, spherical mean, spline curve, spline interpolation

## 17 Geometric continuity, shape parameters, and geometric constructions for Catmull-Rom splines



Tony D. DeRose, Brian A. Barsky

January 1988 **ACM Transactions on Graphics (TOG)**, Volume 7 Issue 1

**Publisher:** ACM Press

Full text available: pdf(2.31 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Catmull-Rom splines have local control, can be either approximating or interpolating, and are efficiently computable. Experience with Beta-splines has shown that it is useful to endow a spline with shape parameters, used to modify the shape of the curve or surface independently of the defining control vertices. Thus it is desirable to construct a subclass of the Catmull-Rom splines that has shape parameters. We present such a class, some members of which are inte ...

**18 Local Control of Bias and Tension in Beta-splines**

Brian A. Barsky, John C. Beatty

April 1983 **ACM Transactions on Graphics (TOG)**, Volume 2 Issue 2**Publisher:** ACM PressFull text available: [pdf\(1.31 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)**19 A new local basis for designing with tensioned splines**

Elaine Cohen

April 1987 **ACM Transactions on Graphics (TOG)**, Volume 6 Issue 2**Publisher:** ACM PressFull text available: [pdf\(2.44 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Recently there has been a great deal of interest in the use of "tension" parameters to augment control mesh vertices as design handles for piecewise polynomials. A particular local cubic basis called B-splines, which has been termed a "generalization of B-splines," has been proposed as an appropriate basis. These functions are defined only for floating knot sequences. This paper uses the known property of B-splines that with appropriate knot vectors span what are called h ...

**20 Weighted bicubic spline interpolation to rapidly varying data**

Thomas A. Foley

January 1987 **ACM Transactions on Graphics (TOG)**, Volume 6 Issue 1**Publisher:** ACM PressFull text available: [pdf\(2.78 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

The weighted bicubic spline that is a C1 piecewise bicubic interpolant to three-dimensional gridded data is introduced. This is a generalization of the univariate weighted spline, developed by Salkauskas, in that a weighted minimization problem is solved. The minimization problem solved is a weighted version of the problem that the natural bicubic spline and Gordon's spline-blended interpolants minimize. The surface is represented as a piecewise bicubic Hermite interpol ...

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IEE JNL	IEE Journal or Magazine
IEEE CNF	IEEE Conference Proceeding
IEE CNF	IEE Conference Proceeding
IEEE STD	IEEE Standard

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1. **Fitting optimal piecewise linear functions using genetic algorithms**  
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 Pattern Analysis and Machine Intelligence, IEEE Transactions on  
 Volume 22, Issue 7, July 2000 Page(s):701 - 718  
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[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(408 KB) IEEE JNL
2. **Electromagnetic imaging of two-dimensional perfectly conducting cylinders with transverse field**  
 Anyong Qing;  
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[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(565 KB) IEEE JNL
3. **Evolutionary learning of BMF fuzzy-neural networks using a reduced-form genetic algorithm**  
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 Volume 33, Issue 6, Dec. 2003 Page(s):966 - 976  
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4. **Using NU-SSGA to reduce the searching time in inverse problem of a buried metallic object**  
 Wei Chien; Chien-Ching Chiu;  
 Antennas and Propagation, IEEE Transactions on  
 Volume 53, Issue 10, Oct. 2005 Page(s):3128 - 3134  
 Digital Object Identifier 10.1109/TAP.2005.856362  
[AbstractPlus](#) | Full Text: [PDF](#)(504 KB) IEEE JNL
5. **Genetic algorithm for edge extraction of glomerulus area**  
 Jun Zhang; Hong Zhu; XueMing Qian; Tao Huang;  
 Information Acquisition, 2004. Proceedings. International Conference on  
 21-25 June 2004 Page(s):335 - 338  
 Digital Object Identifier 10.1109/ICIA.2004.1373383  
[AbstractPlus](#) | Full Text: [PDF](#)(1064 KB) IEEE CNF
6. **Evolutionary algorithm based offline/online path planner for UAV navigation**

Nikolos, I.K.; Valavanis, K.P.; Tsoveloudis, N.C.; Kostaras, A.N.;  
Systems, Man and Cybernetics, Part B, IEEE Transactions on  
Volume 33, Issue 6, Dec. 2003 Page(s):898 - 912  
Digital Object Identifier 10.1109/TSMCB.2002.804370

[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(2343 KB) IEEE JNL



**7. Computationally effective search and optimization procedure using coarse to fine approxm**

Nain, P.K.S.; Deb, K.;  
Evolutionary Computation, 2003. CEC '03. The 2003 Congress on  
Volume 3, 8-12 Dec. 2003 Page(s):2081 - 2088 Vol.3  
Digital Object Identifier 10.1109/CEC.2003.1299929

[AbstractPlus](#) | Full Text: [PDF](#)(1653 KB) IEEE CNF



**8. Electromagnetic inverse scattering of multiple two-dimensional perfectly conducting object evolution strategy**

Anyong Qing;  
Antennas and Propagation, IEEE Transactions on  
Volume 51, Issue 6, June 2003 Page(s):1251 - 1262  
Digital Object Identifier 10.1109/TAP.2003.811492

[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(583 KB) IEEE JNL



**9. Parameter optimization for B-spline curve fitting using genetic algorithms**

Kumar, G.S.; Kalra, P.K.; Dhande, S.G.;  
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Volume 3, 8-12 Dec. 2003 Page(s):1871 - 1878 Vol.3  
Digital Object Identifier 10.1109/CEC.2003.1299902

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**10. Cooperative-competitive genetic evolution of radial basis function centers and widths for tin**

Whitehead, B.A.; Choate, T.D.;  
Neural Networks, IEEE Transactions on  
Volume 7, Issue 4, July 1996 Page(s):869 - 880  
Digital Object Identifier 10.1109/72.508930

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**11. A Genetic Algorithm-Based Approach to Knowledge-Assisted Video Analysis**

Voisine, N.; Dasiopoulou, S.; Precioso, F.; Mezaris, V.; Kompatsiaris, I.; Strintzis, M.G.;  
Image Processing, 2005. ICIP 2005. IEEE International Conference on  
Volume 3, 11-14 Sept. 2005 Page(s):441 - 444

[AbstractPlus](#) | Full Text: [PDF](#)(304 KB) IEEE CNF



**12. IEEE transactions on magnetics cumulative index 1985-2000 volumes 21-36 [Author Index]**

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Volume 37, Issue 6, Part 2, Nov 2001 Page(s):1 - 466  
Digital Object Identifier 10.1109/TMAG.2001.966141

[AbstractPlus](#) | Full Text: [PDF](#)(4148 KB) IEEE JNL



**13. TCM assisted genetic-algorithm aided reduced-complexity multiuser detection**

Ng, S.X.; Yen, K.; Hanzo, L.;  
Electronics Letters  
Volume 38, Issue 14, 4 July 2002 Page(s):722 - 724

[AbstractPlus](#) | Full Text: [PDF](#)(425 KB) IEE JNL



**14. Design optimization of electrical machines using genetic algorithms**

Uler, G.F.; Mohammed, O.A.; Chang-Seop Koh;  
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Volume 31, Issue 3, May 1995 Page(s):2008 - 2011  
Digital Object Identifier 10.1109/20.376437

[AbstractPlus](#) | Full Text: [PDF\(436 KB\)](#) IEEE JNL



#### 15. 2004 Index

Systems, Man and Cybernetics, Part B, IEEE Transactions on  
Volume 34, Issue 6, Dec 2004 Page(s):2497 - 2524  
Digital Object Identifier 10.1109/TSMCB.2004.1365634

Full Text: [PDF\(280 KB\)](#) IEEE JNL



#### 16. Inverse shape optimization using dynamically adjustable genetic algorithms [electric machi

Cingoski, V.; Kaneda, K.; Yamashita, H.; Kowata, N.;  
Energy Conversion, IEEE Transactions on  
Volume 14, Issue 3, Sept. 1999 Page(s):661 - 666  
Digital Object Identifier 10.1109/60.790932

[AbstractPlus](#) | [References](#) | Full Text: [PDF\(612 KB\)](#) IEEE JNL



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and Applications, IEEE Transactions on]  
Volume 51, Issue 12, Dec 2004 Page(s):2520 - 2554  
Digital Object Identifier 10.1109/TCSI.2004.1365645

Full Text: [PDF\(280 KB\)](#) IEEE JNL



#### 18. A highly interpretable form of Sugeno Inference systems

Bikdash, M.;  
Fuzzy Systems, IEEE Transactions on  
Volume 7, Issue 6, Dec. 1999 Page(s):686 - 696  
Digital Object Identifier 10.1109/91.811237

[AbstractPlus](#) | [References](#) | Full Text: [PDF\(236 KB\)](#) IEEE JNL



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Michael Nashvili, Markus Olhofer, Bernhard Sendhoff

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

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**Keywords:** design optimization, evolution strategies, morphing methods, phenotypic recombination

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In this paper, we present the application of evolutionary optimization methods to a demanding, industrially relevant engineering domain, the three-dimensional optimization of gas turbine stator blades. This optimization problem is high-dimensional search and computationally very expensive. We show that, despite of its difficulty, the problem is feasible. Our approach not only successfully optimizes the aerodynamic design but also yields interesting results from an engineering point of view.

**Keywords:** covariance matrix adaptation, design optimization, evolutionary strategies, real world application

2 [Evolutionary strategies and evolutionary programming: Morphing methods in](#)[evolutionary design optimization](#)

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